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## BOOK REVIEWS

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*Animal Intelligence.* By E. L. THORNDIKE. New York, The Macmillan Company. 1911. pp. viii., 297.

Portions of Professor Thorndike's book have already appeared elsewhere; but many pages of new,—not to say novel,—material have been added, and the whole is now presented in a form which is at once more systematic and more readily comprehensible.

The opening chapter discusses the relation of consciousness to behavior, and the possibility of studying consciousness objectively. The author holds that it is quite as legitimate to study consciousness for the purpose of determining what an individual can or will do, as to study behavior in order to determine what mental processes are or may be present; and that psychology may therefore be as independent of introspection as physics is. Nor is there any impassable gulf between physical facts and mental facts, between bodies and minds, between movements and conscious processes. In order to illustrate this continuity of phenomena, the author assumes a case in which one is called upon to learn six things about a given animal,—say, John Smith,—*viz.*: its height, the color of its hair, its toothache, its anxiety, and its thinking of seven-times-nine. The first two items are clearly accessible to objective study. The intensity of the tooth-ache may likewise be determined objectively, by employing certain familiar symptoms as criteria; and the same is true of even such phenomena as anxiety and the processes of thinking. In the latter cases one finds not an absolute inability, on the part of the observer, to tell what John's experience is, but only a greater variability in the observers' estimates; and this variability would be lessened if we possessed a more intimate knowledge of the manifestations of such an experience, and better means of describing, classifying and measuring it. Pain, anxiety and opinions are no more matters of direct consciousness than are height, temperature and color, or than the sun, moon and stars.

The author makes use of this conception of consciousness as a background for his more fundamental hypothesis concerning the relation between consciousness and behavior, and the possibility of obtaining an insight into the nature of the animal mind. Behavior includes consciousness *plus* action. Behavior is therefore raised to a position of supreme importance; and a theory of animal intelligence which is based upon behavior is furnished with a scientific justification.

Chapters II., III., IV. and V. are essentially reprints of the author's well-known papers on Animal Intelligence, Instinctive Reactions of Young Chicks, Psychology of Fishes, and the Mental Life of Monkeys. The text in these four chapters is republished in practically unchanged form, although the author confesses that he finds it difficult "to resist the impulse to temper the style . . . with a certain sobriety and restraint" which the exuberance of his youth did not prompt.

The most general law presented in the chapter on Laws and Hypotheses of Behavior is that behavior is predictable, *i. e.*, that the same situation will, in the same animal, produce the same response either through original or acquired determinants. All acquired behavior falls

under two laws; first, the Law of Effect, having to do with the degree of comfort or discomfort, and, second, the Law of Exercise, *i. e.*, the law of repetition. All behavior can be explained by one or more of these three laws. In harmony with his former publications, the author definitely denies that imitation can determine behavior. Even in the case of the child's learning to talk, there occur fortuitous sounds in the promiscuous babblings which bring satisfaction in the way of parental caressing. In fact, there is no indication in any activity whatever that the idea of a response, apart from instinctive tendency or former experience, is able to produce that response.

The last chapter deals with the Evolution of the Human Intellect. Since Darwin's discoveries, biologists have worked out a fairly satisfactory physical genealogy of the human race. Much less has been done to find the origin of intellect and to trace its progress up to human faculty. The author holds that all animals manifest fundamentally the same sort of intellectual life; and that human psychology is only higher animal psychology. We must trace out a mental series analogous with the physiological series of the biologists. Then and then only will it be appreciated that "amongst the minds of animals that of man leads, not as a demigod from another planet, but as a king from the same race."

Such, in brief, are Thorndike's problems and conclusions. The book takes rank as one of the classics in this field and is all the more important coming from one who has done so much to introduce the experimental method into comparative psychology. It is only with the view of stimulating helpful criticism that the present review ventures to question any of the author's deductions.

Comparative psychologists would, indeed, deem themselves fortunate if they could assume with Thorndike that introspection adds nothing to our knowledge of behavior. They would then feel less keenly that it behooves them to speak "with a certain sobriety and restraint" in exploiting such inferences regarding the nature of the animal mind as they may draw from their observations of animal behavior. But the current literature of comparative psychology voices so many discordant and apparently irreconcilable views that the modern reader is no longer shocked by a theory which subordinates consciousness to behavior. It will probably turn out that psychologists will refuse to endorse this conception of consciousness,—a conception which is neither a natural nor a necessary consequence of the observed facts upon which its author bases it. Indeed, the view of consciousness which is here presented seems to be designed more to justify a procedure than to explain the findings obtained by that procedure.

In regard to his laws of behavior, one is immediately confronted by the problem as to how they will explain concrete cases. Learning to talk is not a good example of imitation. Most psychologists will agree with the author that skill in talking comes through trial and success. What of the numerous cases of reactions which seem to spring full grown from a single immediate situation and which still manifest themselves in terms of the situation? Even though we take the author's estimate of one in ten of this character we have an enormous number of reactions to account for. Must we, in such cases, seek phylogenetically for the basis of an instinct, or ontogenetically for a former experience? Learning to talk is not even typical of many forms of activity which must be explained, although the author gives almost entire emphasis to this one activity and makes little effort to classify others under his laws. The argument that the idea of an act cannot produce the act might be met by the equally demonstrable argument

that the idea of an act is impossible until the reflex physiological component is established. Thought is predominantly motor; and this is especially true of any thought which would raise the question of imitation. Thorndike may deny that a causal relation exists between the idea and the reaction; but it may still be that there is concomitance between the two, outside of experience. The doctrine of psychophysical parallelism is disregarded in the author's assumption without being either disproved or denied. The reviewer finds an apparent inconsistency between certain statements which are fundamental to Thorndike's general position. How is one to reconcile "the same situation will, in the same animal, produce the same response" (p. 341) with "of several responses made to the same situation" (p. 244)? How will these appear in the light of his principle of abstraction (p. 263)? How can all of these views be brought into relation with his definition of "situation" (p. 283)? What is there in the author's generalized Law of Effect (p. 244) which is not circular with his definitions of satisfying and discomforting (p. 245)?

The last chapter is well written and presents a probable psychology of the future. The author ventures to outline how comparative psychology may come to hold the same relation to the psychology of consciousness that biology now holds to physiology. No one now before the public is better fitted by training and experience to arrange this psychic series than the man who has taken the lead in so many other lines of research. Let us hope that Thorndike will find it possible to amplify his last chapter into a companion book in the *Animal Behavior Series*.  
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*A Text-Book of Experimental Psychology with Laboratory Exercises.*

By C. S. MYERS. Second edition. Cambridge, The University Press; New York, Longmans Green & Co., 1911. Part I., Text-book. pp. xiv., 344. Part II., Laboratory Exercises. pp. ii., 107.

Dr. Myers' Text-book was noticed in this JOURNAL, xx., 462, on its appearance. It has now attained a second edition—a matter of congratulation both to the author and to his countrymen; and it has been issued, wisely, in two parts.

I find little change in the Laboratory Exercises: an experiment on after-sensations of hearing has been removed, and two experiments on labyrinthine sensations have been added. The text of Part I. has been revised throughout. The most striking additions are the references to Head's 1911 *Croonian Lectures*, which appear in ch. ii. (Cutaneous and Visceral Sensations), xvi. (Muscular Effort), xvii. (Local Signature), xviii. (Sensibility and Sensory Acuity), xix. (Identity and Difference), and xxiv. (Feeling), and the new chapter on Thought and Volition. In the latter, Dr. Myers discusses the question of imageless thought. I am not sure that I understand him; but I will give what account I can of his position.

(1) There is, first of all, the matter of 'act' and 'content.' Dr. Myers believes that the 'act' is introspectively separable from the 'content' in such experiences as perceiving, imagining, attending, thinking, desiring, reasoning, but that it does not show specific differences; always what is left, when contents are removed, is "the conative experience of mental activity." In the case of thought, the separation of 'act' from 'content' is most easily made when (possibly is dependent on the circumstance that) there is difficulty or obstruction in the course of thinking.